UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/783,621	02/20/2004	Anoop Mukker	42390.P18614	7209

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INTEL/BLAKELY
1279 OAKMEAD PARKWAY
SUNNYVALE, CA 94085-4040

EXAMINER
MCFADDEN, MICHAEL B

ART UNIT	PAPER NUMBER
2188	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/783,621	MUKKER ET AL.
	Examiner	Art Unit	
	Michael B. McFadden	2188	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>19 March 2008</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-4,6-8,10-16,18-22 and 24-34</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-4,6-8,10-16,18-22 and 24-34</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>20 February 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail. Date _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Request for Continued Examination

1.　　A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 19 March 2008 has been entered.

Status of Claims

2.　　Claims 1-4, 6-8, 10-16, 18-22, and 24-34 are pending in the Application.

3.　　Claims 5, 9, 17, 23, and 35-40 are cancelled.

Response to Amendment

4.　　Applicant's arguments filed on 19 March 2008 have been fully considered but they are not persuasive.

Claim Objections

5.　　Claims 10-12 are objected to because of the following informalities: claim 10 depends on the canceled claim 9. Appropriate correction is required. For the following rejection, claim 10 is treated as if depends on claim 8.

Claim Rejections - 35 USC § 103

6.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed
> or described as set forth in section 102 of this title, if the differences between the
> subject matter sought to be patented and the prior art are such that the subject
> matter as a whole would have been obvious at the time the invention was made
> to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was
> made.

7.   Claims 1-4, 6-8, 10-16, 18-22, and 24-34 are rejected under 35 U.S.C. 103(a) as

being anticipated by Cai et al. (US Patent No. 6,349,363 (herein after Cai)) and further

in view of Gaither (US Patent No. 6,434,672).

8.   **Regarding Claims 1, 7, 13, 19, and 25,** Cai discloses partitioning a cache array

into one or more special-purpose entries and one or more general-purpose entries **(Cai:**

Column 2, Lines 57-60), wherein special-purpose entries are only allocated for one or

more streams having a particular stream ID, wherein the stream ID is stored outside the

cache array; **(Cai: Column 3, Lines 43-49 and Column 4, Lines 25-42)** wherein the

special-purpose entries to use a first cache replacement algorithm and the one or more

general-purpose entries to use a second cache replacement algorithm **(The cache**

must inherently utilize a replacement algorithm for every cache it controls. The

claim does not require that the first and second algorithms are distinctly different

algorithms. Therefore, Cai teaches using a first algorithm for the first cache and a

second algorithm for the second.); determining if a cross-access scenario exists

between at least one of the one or more special purpose entries and at least one of the

one or more general purpose entries. **(Cai: Column 6, Lines 17-19) Snooping allows the caches to know if they contain the same information as another cache in the same system and if a write operation is being performed on the information. Therefore, snooping does determine if a cross access scenario exists.**

9.   Cai fails to disclose if the cross-access scenario exists, permitting cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access scenario.

10.   Gaither discloses if the cross-access scenario exists, permitting cross-access of data between the at least one of the one or more special-purpose entries and the at least one of the one or more general-purpose entries that relate to the cross-access scenario. **(Gaither: Column 4, Lines 57-62 and Column 5, Lines 43-47.)**

11.   Cai and Gaither are analogous art because they are from the same field of endeavor, memory architecture.

12.   At the time of the invention it would have been obvious to one of ordinary skill in the art to include the snarf capability of Gaither in the system of Cai.

13.   The motivation for doing so would have been ensuring the coherency of the cached data and therefore improving cache efficiency. **(Gaither: Column 4, Lines 60-62.)**

14.   Therefore it would have been obvious to include the snarf capability of Gaither in the system of Cai for the benefit of ensuring the coherency of the cached data and therefore improving cache efficiency to obtain the invention as specified in claim 1.

15.   **Regarding Claims 2, 8, 14, 20, and 30,** Cai and Gaither disclose allocating the

one or more special purpose entries based on the particular stream ID and a particular

input address. **(Cai: Column 3, Lines 43-49 and Column 4, Lines 25-42 and Figure**

3, Element 162). The EID coupled with input address locate where the entries, in

the cache, will be placed. A cache input address is inherent in accessing stored

data because that is how data is located in a cache.

16.   **Regarding Claims 3, 15, and 21,** Cai and Gaither disclose storing data from the

one or more streams in the one or more special-purpose entries when the particular

stream ID and the particular input address match a predetermined stream ID and a

predetermined input address; and storing data from the one or more streams in the one

or more general-purpose entries when the particular stream ID and the particular input

address do not match the predetermined stream ID and the predetermined input

address. **(Cai: Column 3, Lines 43-49 and Column 4, Lines 25-42 and Figure 3,**

Element 162). The EID coupled with input address locate where the entries, in the

cache, will be placed. A cache input address is inherent in accessing stored data

because that is how data is located in a cache. The general-purpose entries

would be stored in the default cache with the "default EID identifier".

17.   **Regarding Claims 4, 10, 16, 22, 28, 29, 31, and 32,** Cai and Gaither disclose

determining when the particular stream ID and the particular input address match the

predetermined stream ID and the predetermined input address using special-purpose

control logic. **(Cai: Column 3, Lines 1-13 and Column 4, Lines 9-25 and Column 5,**

Line 62 – Column 6, Line 7). The memory controller manages multiple cache

partitions and is able to differentiate multiple EIDs. Being able to differentiate

between more than two EIDs shows that special logic is used to determine the

cache location from the address and EID.

18.   **Regarding Claims 6, 12, 18, 24, 26, 34,** Cai and Gaither disclose wherein the

special-purpose stream includes a data stream and wherein the system contains an I/0

hub interface connected to a bus, a processor interface; and a host AGP controller

connected to the system memory controller via the bus; wherein the cache array

receives the cache operation requesting data via the one or more interfaces, and

returns a cache hit in response to the cache operation, wherein the cache has a

pending fetch for the data in response to a prior cache operation requesting the data.

(Cai: Column 6, Line 60 – Column 7, Line 5)

19.   **Regarding Claim 11 and 33,** Cai and Gaither disclose a DRAM controller

integrated with the cache memory array. **(Cai: Column 5, Lines 12-16) A DRAM is**

controlled by a DRAM controller.

20.   **Regarding Claim 27,** Cai and Gaither disclose wherein the processor interface

connects a plurality of processors **(Figure 2 and Column 6, Line 44 – Column 7, Line**

14), the plurality of processors including a 16-bit processor and a 64-bit processor.

From Figure 2 it can be seen that the caches are connected to a memory hub.

Also connected to the hub are many devices. The text also discloses the caches

connected to the multiple devices and controllers. The various devices and

controllers inherently have their own processors. Therefore disclosing a plurality

of processors. **The size of the processors is a design choice and therefore does not carry patentable weight.**

<u>*Response to Arguments*</u>

21.   Applicant's arguments filed on 19 March 2008 have been fully considered but they are not persuasive.

22.   **Regarding Claim 1,** the Applicant contends that Cai fails to disclose determining if there is a cross-access scenario between caches. **However, as previously stated snooping allows the caches to know if they contain the same information as another cache in the same system and if a write operation is being performed on the information. Therefore, snooping does determine if a cross access scenario exists.** The Applicant also contends that snarfing does not describe permitting cross-access between caches or sections of a cache. **However, snarfing, as described by the Applicant, updates its own copy of a memory location when it is modified in main memory. This would result in two copies of the same location to be present in two different caches. Therefore, snarfing would permit, and require, that a cross-access scenario exists.** The Applicant further contends that neither reference teaches that each cache has its own replacement algorithm. **However, each cache must inherently possess a replacement algorithm. The claim does not require that the algorithm used by the first cache be different from that of the second. Therefore, Cai and Gaither do disclose that each cache would have its own replacement algorithm.**

23.   Regarding all other Claims not specifically traversed above and whose rejections

were upheld, the Applicant contends that the listed claims are allowable by virtue of

their dependence on other allowable claims. As this dependence is the sole rationale

put forth for the allowability of said dependent claims, the Applicant is directed to the

Examiner's remarks above. Additionally, any other arguments the Applicant made that

were not specifically addressed in this Office Action appeared to directly rely on an

argument presented elsewhere in the Applicant's response that was traversed, rendered

moot or found persuasive above.

Conclusion

24.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Michael B. McFadden whose telephone number is

(571)272-8013. The examiner can normally be reached on Monday-Friday 8:30 - 5:00.

         If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Sam Sough can be reached on (571)272-6799. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

         Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

/Hyung S Sough/
Supervisory Patent Examiner, Art Unit 2188
06/06/08

MBM
06/03/2008